REMARKS

In the Office Action mailed August 10, 2004, claims 1-8 and 17-20 were rejected under 35 U.S.C. §102(b) as anticipated by Takenaka (US 5,614,752).

In this response, claims 2, 3 and 17-20 have been cancelled, claims 1, 4 and 5 have been amended and new claims 23-46 have been added.

Claim 1 as amended recites a method for forming a device comprising the steps of forming isolation regions defining an active area of the device, forming a gate, a source, a drain, first and a second source/drain extension regions, and first and second corner diffusion regions. The gate, the source, the drain, and the first and second source/drain extension regions extend between two opposite sides of the active area of the device; and the corner diffusion regions and the source/drain extension regions overlap in areas adjacent the isolation regions. The corner diffusion regions serve the purpose of reducing dopant concentration in these areas. The reduced dopant concentrations in the areas adjacent the isolation regions help resolve problems such as leakage and inverse narrow width effect associated with the formation of the isolation regions, especially when these isolation regions are formed using shallow trench isolation techniques.

Claim 1 as amended is distinguishable from Takenaka. Takenaka discloses a semiconductor device that is a transistor or diode having a low breakdown voltage for use in a protection circuit. The low breakdown voltage is achieved by forming a low concentration diffusion layer next to a high concentration diffusion layer of the device. The transistor in Takenaka has source/drain diffusion regions 102, LDD regions 103 that are extensions of the source/drain diffusion regions, and low-concentration diffusion regions 106 adjacent isolation regions, wherein the low-concentration diffusion regions 106 are of opposite conductivity type as the source/drain diffusion regions and the LDD regions. Unlike the source/drain extension regions in amended claim 1, the LDD regions 103 in Takenaka do not extend between opposite sides of an active area so as to overlap with the low-concentration diffusion regions 106. Rather "regions 103 are formed in the designated regions by using photoresist to form the designated pattern as in Fig. 1(a).". Col. 3, lines 16-17. Subsequently, "after forming a designated pattern using photoresist, p-type regions 106... are formed by the ion implantation of boron..." Col. 3, lines 19-22. Thus, Takenaka does not teach the use of overlapping regions as claimed by applicants; and claim 1 as amended is patentable over Takenaka.

Claims 4-8 and new claims 23-32 depend from claim 1 and include further limitations in addition to the limitations in claim 1. Therefore, claims 4-8 and new claims 23-32 are patentable for the same reason claim 1 is patentable.

New claim 33 recites a method for forming a device comprising the steps of forming isolation regions defining an active area of the device, forming a gate, and first, second, third and fourth diffusion regions. The gate, and the first, second, third and fourth diffusion regions extend between two opposite sides of the active area of the device; and the fourth diffusion region includes two edge portions adjacent respective ones of the isolation regions and a middle portion between the two edge portions. The two edge portions are doped with dopants of both conductivity types in comparable concentrations while the middle portion of the fourth diffusion region is doped with dopants of one conductivity type. The middle portion can be a source/drain extension region, serving its normal purpose, while the dopants of opposite conductivity types in the edge portions effectively cancel each other out. As a result, the edge portions have reduced dopant concentrations to take care of the many problems near the isolation regions, as explained in the specification.

Claim 33 is distinguishable from Takenaka. Unlike the claimed invention recited in claim 33, the transistor in Takenaka does not have a diffusion region including two edge portions adjacent respective ones of isolation regions that are doped with dopants of both conductivity types in comparable concentrations, and a middle portion between the two edge portions that is doped primarily with dopants of one conductivity type. Although Takenaka discloses a transistor having low-concentration diffusion regions 106 adjacent isolation regions and sandwiching LDD regions 103, the low-concentration diffusion regions 106 in Takenaka are not doped with dopants of opposite conductivity types in comparable concentrations. If so, the dopants of opposite conductivity types in comparable concentration would effectively cancel each other and the purpose of Takenaka to use the low-concentration diffusion region to obtain a low breakdown voltage of the junction between the low-concentration diffusion region and the source of drain region would be defeated (Col. 3, lines 18-23 and 39-41). Therefore, claim 33 as amended is patentable over Takenaka.

Claims 34-38 depend from claim 33 and include further limitations in addition to the limitations in claim 33. Therefore, claims 34-38 are patentable for the same reason claim 33 is patentable.

Independent claim 39 is similar to claim 1 and requires that fifth and sixth diffusion regions overlap a fourth diffusion region in areas adjacent to the first and second isolation

regions, respectively. As noted above, Takenaka's regions 103 and 106 do not overlap. Accordingly, claim 39 and dependent claim 40 and 41 are believed patentable.

Independent claim 42 recites a method for forming a device comprising the steps of forming a gate, first and second diffusion regions on opposite sides of the gate, third and fourth diffusion regions between the gate and respective ones of the first and second diffuison regions, and a fifth diffusion region overlapping with the fourth diffusion region. The gate and the diffusion regions extend across the width of the device; and the fifth diffusion region and the fourth diffusion region are doped with dopants of opposite conductivity types in comparable concentrations and extend from a surface of the substrate to depths that are close to each other. New claim 42 is patentable over Takenaka at least because the device includes the fifth diffusion region overlapping with the fourth diffusion region and extending across the width of the device. In Takenaka, neither the low-concentration regions nor the LDD regions extend across the width of the device. Therefore, new claim 42 is patentable over Takenaka.

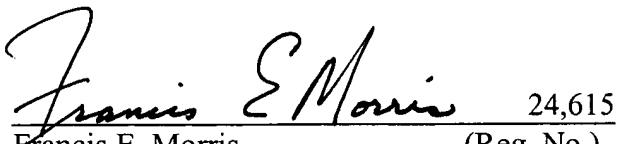
New claims 43-46 depend from new claim 42 and include further limitations in addition to the limitations in claim 36. Therefore, new claims 43-46 are patentable for the same reason new claim 42 is patentable.

In view of the foregoing, applicants believe that all of the claims are now in condition for allowance and respectfully requests the Examiner to pass the subject application to issue.

No fee is believed due for filing this response. However, if a fee is due, please charge such fee to Morgan, Lewis & Bockius LLP, Deposit Account No. 50-0310.

Respectfully submitted,

Date November 8, 2004



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